

WHAT IS CLAIMED IS

1. A photosensitive thin film of thermally-assisted, organometallic, sol-gel derived glass doped with organometallic photosensitizer, including R-M-X inclusions where X is a photolabile moiety, M is a metal, and R is a volatile organic compound, said film having a thickness in excess of one micron.
2. A thin film as in claim 1, said film being formed on a substrate having a surface including silicon and oxygen.
3. A thin film as in claim 2 wherein said surface comprises SiO₂ and is a silica enriched thin layer on a silicon substrate.
4. A thin film as in claim 1, said film being formed on a glass substrate.
5. A thin film as in claim 1, said film where R is taken from a class of low-volatile organic molecules consisting of CH₃, CH₃-CH₂ and CH₃-CH₂-CH₂ and (Cp), M is taken from a class consisting of metals in group IVA and IVB, transition metals and rare earth metals, and X is taken from a class consisting of and photolabile moiety including halogens and carbonyls.
6. A thin film as in claim 3 where R comprises CH₂, M comprises Sn, and X comprises I.
7. A thin film as in claim 3 wherein R comprises cyclopentadienyl.
8. A thin film as in claim 3 wherein M comprises T.
9. A thin film as in claim 3 wherein X comprises Cl.
10. A thin film as in claim 4 wherein R comprises CH₃.
11. A thin film as in claim 4 wherein M comprises Pb.
12. A thin film as in claim 4 wherein X comprises Cl.

13. A thin film as in claim 2 including thereon a mask opaque to light in the UV and visible ranges.

14. A thin film of sol-gel derived glass on a silica substrate, said film including at least one region of $\text{Si} - \text{O} - \text{M} - \text{O} - \text{Si}$ with adjacent regions of SiO_2 , said film having a thickness substantially in excess of one micron and being free of cracks.

15. A method for forming a photosensitive sol-gel film including regions of different indices or refraction, said method comprising the steps of forming a photosensitive sol-gel film including an organometallic photosensitizer on a silica substrate, exposing said film through a mask to light of a wavelength and for a time for unbinding different amounts of metal constituents and of said sensitizer in different sections along at least a first channel thereof, exposing said film to heat at a first temperature and for a time to drive off the unbound sensitizer and to bind the metal constituents of said sol-gel film, and exposing said layer to heat at a second temperature higher than said first temperature for a time to unbind and drive off the organic constituents of said sol-gel film.